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## **Use of wide swath bathymetry systems for habitat mapping, acoustic seafloor classification, and determining shellfish abundance**

### *Results from shallow water habitat mapping for Allen Harbor Restoration and Monitoring Project*

This paper proposes to demonstrate the results of a survey project in Upper Narragansett Bay. The data was collected by the University of Rhode Island and produced for the Rhode Island Department of Environmental Management as part of the Allen Harbor Restoration Project. The shallow half meter to four meter water depth of this area provides unique challenges for a total coverage acoustic survey and subsequent processing of the acoustic data for seafloor characterization. A subsample of acoustic data from a shallow cove in the study area, along with a portion of supporting ground truth data, will be discussed to demonstrate the need for special considerations and unique methodologies in very shallow water.

The aim of this overall project is to compare the results from commercially available, acoustic classification software and the results to the supporting non acoustic data in the survey region. The commercially available, acoustic classification software data will be processed using algorithms in supervised and unsupervised modes of operation. The supporting ground truth data will include a combination of sediment profile imagery camera surveys, underwater video surveys and bottom grabs for benthic biology and grain size. The results of the habitat map will be compared with the shellfish type and abundance determined by the Rhode Island Department of Environmental Management surveys.

During this study, there is a particular area of interest in Greenwich Bay, Rhode Island. The concentration of study in this estuarine habitat is partly due to recent fish kills and anoxic conditions. The results from the commercially available, acoustic classification software could help determine whether there is an acoustic approach to determining a relationship between shellfish abundance and habitat (bottom type). In addition, we will attempt to determine if shellfish abundance is related to the frequency and duration of hypoxia events within the shallow waters of Greenwich Bay.